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Matthew R. Schantz
Woodard, Emhardt, Naughton, Moriarty and McNett
Bank One Center/Tower
111 Monument Circle, Suite 3700
Indianapolis, IN 46204-5137

| EXAMINER |
|---|
| GUILL, RUSSELL L |

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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*Ex parte* OLEG WASYNCZUK, CHARLES E. LUCAS,
ERIC A. WALTERS, JURI V. JATSKEVICH, and STEVEN F. GLOVER

_____

Appeal 2008-1496
Application 09/884,528
Technology Center 2100

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Decided: June 2, 2008

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Before MICHAEL R. FLEMING, *Chief Administrative Patent Judge,*
LEE E. BARRETT, ALLEN R. MACDONALD, LINDA E. HORNER, and
JOHN A. JEFFERY, *Administrative Patent Judges.*

MACDONALD, *Administrative Patent Judge.*

DECISION ON APPEAL

## STATEMENT OF CASE

### *Introduction*

Appellants appeal under 35 U.S.C. § 134 from a final rejection of claims 1-13, 16-20, 24-26, 29, and 31-42. Claims 14, 15, 21-23, 27, 28, and 30 have been canceled. Claims 43 and 44 are not rejected. We have jurisdiction under 35 U.S.C. § 6(b).

According to Appellants, the invention relates to computer programs that simulate systems. More specifically, the invention relates to simulation systems using a distributed computer network, wherein subsystems can be simulated independently, the subsystem simulations communicating the values of input/output variables to simulate subsystem interaction. (Spec., ¶ [0003].)

### *Exemplary Claim(s)*

Exemplary independent claims 1 and 9 under appeal read as follows:

1. A computer-implemented system, comprising:

a first executing process that:

implements a first continuous-time model to simulate a first physical subsystem, the first model being programmed in a first language and having a first state variable; and

sends a first series of state-related numerical values, each numerical value reflecting information relating to the value of the first state variable at a different point $t_m$ in simulation time in the first model; and

a second executing process that:

receives said first series of state-related numerical values from said first executing process without said first series of state-related numerical values passing through a central communication process;

implements a second continuous-time model to simulate a second physical subsystem, the second model being programmed in a second language and taking as an input values from said first series of state-related numerical values; and

outputs data representative of a state of the second continuous-time model.

9. A computer-implemented method for simulating operation of a physical system having a plurality of physical subsystems, comprising:

simulating a first physical subsystem with a first continuous-time simulation on a first physical computing device;

accepting a request for export of information relating to a number $n$ of state-related variables that characterize the state of the first physical subsystem in said simulating;

sending a first series of state-related messages, each message containing information relating to the value of at least one of the $n$ state-related variables;

simulating a second physical subsystem with a second continuous-time simulation on a second physical computing device;

receiving in said second continuous-time simulation said first series of state-related messages from said first continuous-time simulation without

said first series of state-related messages passing through a central communication process; and

outputing [*sic*] data representative of a state of the second continuous-time simulation; wherein:

the first physical subsystem interacts with the second physical subsystem; and

the at least one state-related variable characterizes at least a portion of the interaction between the first physical subsystem and the second physical subsystem.

## *Rejections*

The Examiner rejected claims 1-13, 16-20, 24-26, 29, and 31-42 under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

## *Appellants' Contentions*

Appellants contend that the subject matter of claims 1-13, 16-20, 24-26, 29, and 31-42 is statutory and the Examiner erred in rejecting these claims because:

(A) The claims produce data representing a computer-simulated physical system which is a real world thing (App. Br. 10-13).

(B) Patenting of these claims is not tantamount to patenting a mathematical algorithm (Reply Br. 3).

*Examiner's Findings or Conclusions*

The Examiner concludes that "[t]he claims in the instant application are directed to a machine-implemented abstract idea" (Ans. 6).

*Result*

We affirm-in-part.


ISSUE

Have Appellants established that the Examiner erred in rejecting claims 1-13, 16-20, 24-26, 29, and 31-42 under 35 U.S.C. § 101 as being directed to non-statutory subject matter?


FINDINGS OF FACT

The following Findings of Fact (FF) are shown by a preponderance of the evidence.

*Appellants' Invention*

1.      One form of Appellants' invention is a distributed simulation system.  (Spec., ¶ [0007].)

2.      Further forms include a system in which a plurality of processors each executes a separate program to independently simulate a different portion (subsystem) of a physical system.  *Id.*

3.      Models are utilized to simulate the subsystems.  *Id.*

4.      Various parts of the simulation can be executed using different integration methods.  (Spec., ¶ [0006].)

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5.    In some embodiments, different subsystem model implementations use different techniques and/or parameters for integration (e.g., one model might use the finite Euler integration technique, while another uses Runge-Kutta integration). (Spec., ¶ [0076].)

6.    In Fig. 2, model host computer 23 comprises processor 41, which in one embodiment is a conventional, integrated circuit microprocessor arrangement, such as one or more PENTIUM III or PENTIUM 4 processors (supplied by INTEL Corporation of Santa Clara, California, USA), Athlon processors (supplied by Advanced Micro Devices, Inc., of Sunnyvale, California, USA), or PowerPC processors (supplied by the Semiconductor Products Sector of Motorola, Inc., of Austin, Texas, USA). (Spec., ¶ [0027].)

7.    In some situations, multiple models are executed on multiple distinct computers as shown in relation to computers 23 and 25 in Fig. 1. (Spec., ¶ [0022-0023].)

8.    In other situations, multiple models can be executed on a single computer as shown in relation to computer 27 in Fig. 1. (Spec., ¶ [0024].)

ANALYSIS

A. *Rejection of Method Claims 9-13, 16-20, 24-26, and 34-38 under*
*35 U.S.C. § 101*

Appellants contend that the subject matter of method claims 9-13,
16-20, 24-26, and 34-38 is statutory and the Examiner erred in rejecting
these claims because:

>(A) The claims produce data representing a computer-simulated
physical system which is a real world thing (App. Br. 10-13).

>(B) Patenting of these claims is not tantamount to patenting a
mathematical algorithm (Reply Br. 3).

We disagree with Appellants' contention (A). However, we agree
with Appellants' contention (B). The claimed invention is directed to
statutory subject matter. Claim 9, reproduced *supra*, is exemplary.

The issue is whether Appellants' claims 9-13, 16-20, 24-26, and
34-38, which cover (a) a method of simulating operation of a physical
system having a plurality of physical subsystems involving no
transformation of an article to a different state or thing and (b) a method that
involves one of the other three statutory categories (machine, manufacture,
or composition of matter), are patentable subject matter under 35
U.S.C. § 101.

Appellants' claims are patentable under section 101 because (1) they
do qualify as a "process" under section 101, as that term has been interpreted
by case law, and (2) they do not seek to patent an abstract idea.

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Appellants' claims are the type of method that the Supreme Court and Federal Circuit has found patentable under section 101.

(1)
*Principles Of Law*

The "useful arts" in the Constitution are implemented by Congress in the statutory categories of eligible subject matter in 35 U.S.C. § 101. Section 101 states, "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title." 35 U.S.C. § 101 (2002). "[N]o patent is available for a discovery, however useful, novel, and nonobvious, unless it falls within one of the express categories of patentable subject matter of 35 U.S.C. § 101." *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 483 (1974). The Supreme Court cases prove that § 101 is as much a statutory requirement of patentability as §§ 102, 103, and 112.

Although it has been said that through the 1952 Patent Act "Congress intended statutory subject matter to include anything under the sun that is made by man," *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (quoting S. Rep. No. 1979, 82d Cong., 2d Sess., 5 (1952); H.R. Rep. No. 1923, 82d Cong., 2d Sess., 6 (1952) (internal quotation marks omitted)), the Supreme Court has said that this statement does "not … suggest that § 101 has no limits or that it embraces every discovery." *Id.* "The *obligation* to determine what type of discovery is sought to be patented [so as to

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determine whether it is "the kind of 'discoveries' that the statute was enacted to protect"] *must precede* the determination of whether that discovery is, in fact, new or obvious." *Parker v. Flook*, 437 U.S. 584, 593 (1978) (emphases added).

Section 101 does not provide that a process can simply be a plurality of steps or any method; the courts have rejected such an interpretation. In fact, the Supreme Court has pointed out that its decisions have foreclosed an ordinary, dictionary reading of "process." *See Flook*, 437 U.S. at 589 ("The holding that the discovery of [*Benson*'s] method could not be patented as a 'process' forecloses a purely literal reading of § 101.").

In *Diamond v. Diehr*, the Supreme Court performed a lengthy statutory construction treatment of the term "process" in section 101. 450 U.S. at 181-84. The Supreme Court noted that the term "process" was not formally a category of statutory subject matter until 1952 when Congress inserted that term in section 101 in exchange for the word "art." *Id.* at 182. Nevertheless, a number of Supreme Court cases, dating back to the 19th century, recognized that processes were patent-eligible because they were considered a form of "art" as that term was used in the 1793 Patent Act. *See id.* at 182. After quoting passages from those earlier cases[1] expounding on the long-standing meaning of "process," the *Diehr* Court concluded that the 1952 Patent Act essentially codified the Court's pre-existing definition of

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[1] *Corning v. Burden*, 56 U.S. 252 (1853), and *Cochrane v. Deener*, 94 U.S. 780, 788 (1877).

that term: "Analysis of the eligibility of a claim of patent protection for a 'process' did not change with the addition of that term to § 101." *Id.* at 184. And the Court repeated the definition of "process" it had recently given in *Gottschalk v. Benson*, 409 U.S. 63 (1972): "Transformation and reduction of an article 'to a different state or thing' is the clue to the patentability of a process claim that does not include particular machines." *Diehr*, 450 U.S. at 184 (quoting *Benson*, 409 U.S. at 70).[2]

The Federal Circuit recently quoted with approval this test from *Diehr* as the standard for a statutory process. *See In re Comiskey*, 499 F.3d 1365, 1377 (Fed. Cir. 2007) (request for rehearing *en banc* pending) (quoting same test from *Diehr*). In addition, in *In re Schrader*, 22 F.3d 290 (Fed. Cir. 1994), the Federal Circuit had previously embraced the *Diehr* Court's interpretation of "process," coming to the independent conclusion that Congress incorporated the Supreme Court's already established meaning of "process" into the 1952 Patent Act. *Id.* at 295-96 (citing *Astoria Federal Sav. and Loan Ass'n v. Solimino*, 501 U.S. 104, 106-08 (1991) as standing for the "presumption that well-established common law principles are left unchanged by statutory enactment."); *see also id.* at 295 n.11.

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[2] *See also Flook*, 437 U.S. at 588 n.9 ("this Court has only recognized a process as within the statutory definition when it either was tied to a particular apparatus or operated to change materials to a 'different state or thing.'") (citing *Cochrane*, 94 U.S. at 787-88).

The Supreme Court has also indicated, however, that its current test
for a section 101 process is not necessarily forever fixed or permanent:

> It is argued that a process patent must either be tied
> to a particular machine or apparatus or must
> operate to change articles or materials to a
> 'different state or thing.' We do not hold that no
> process patent could ever qualify if it did not meet
> the requirements of our prior precedents.

*Benson*, 409 U.S. at 71. Rather, the Court made clear that it could be open
to revisiting the standard if a new, unforeseen technology warranted an
exception to its test. *Id.* (explaining that it did not wish to "freeze process
patents to old technologies, leaving no room for the revelations of new,
onrushing technology."). The long-standing *Diehr* test for processes,
however, has provided a reliable, workable set of legal principles, and
nothing in Appellants' claimed method suggests that this case is sufficiently
different from the claims to mathematical algorithms of *Benson* and *Flook*
that would require us to depart from the *Diehr* test.

Moreover, the Supreme Court's construction of "process"
appropriately keeps the scope of that statutory category *in pari materia* with
the other three categories of inventions – manufacture, machine, and
composition of matter. Indeed, *Comiskey* expressly recognized a direct
relationship between "process" and the other categories, observing that a
method claim recites statutory subject matter only if "it is embodied in,
operates on, transforms, or otherwise involves another class of statutory
subject matter, *i.e.*, a machine, manufacture, or composition of matter."

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*Comiskey*, 499 F.3d at 1376 (restating the Supreme Court's transformation or tied to a particular apparatus test for "process").

As the *Comiskey* court observed, such an interpretation advances the Congressional and Constitutional intention that the patent system be directed to protecting technological innovations. *See id.* at 1375, 1378-79. Although the Federal Circuit's predecessor held that the question whether an invention is in the "technological arts" does not by itself constitute the test for patent-eligibility under section 101 (*see In re Toma*, 575 F.2d 872 (CCPA 1978)), the technological focus of the Patent Act and the Patent Clause informs the outer limits of subject matter eligibility under section 101. *See In re Bergy*, 596 F.2d 952, 959 (CCPA 1979) ("the present day equivalent of the term 'useful arts' employed by the Founding Fathers is 'technological arts' "), citing *In re Musgrave*, 431 F.2d 882 (CCPA 1970)), vacated, 444 U.S. 1028, aff'd sub nom., *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).

The Supreme Court recently reaffirmed that patents may issue only for those innovations that promote "the progress of useful arts." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1746 (2007). In this regard, usages of the term "useful arts" contemporaneous with the framing of the Constitution uniformly tie "useful arts" to manufactures and manufacturing processes, thereby providing strong support for the notion that "process" must be interpreted in parity with the other statutory categories.[3]

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[3] *See generally* Daniel Defoe, *A General History of Discoveries and Improvements in Useful Arts* (1727) (providing a history of technological

Against this background, it is unlikely that Congress intended the boundaries of "process" to be so expansive as to accommodate all methods that have a use. Rather, we adhere to the rule that, at least absent the development of some hitherto unknown type of technology, "[t]ransformation and reduction of an article 'to a different state or thing' is the clue to the patentability of a process claim that does not include particular machines." *Diehr*, 450 U.S. at 184 (quoting *Benson*, 409 U.S. at 70).

Whether a method appropriately includes particular machines to qualify as a section 101 process may not always be a straightforward inquiry. As *Comiskey* recognized, "the mere use of the machine to collect data necessary for application of the mental process may not make the claim patentable subject matter." *Comiskey*, 499 F.3d at 1380 (citing *In re Grams*,

developments from biblical times); W. Kenrick, *An Address to the Artists and Manufacturers of Great Britain* (1774) (contrasting the "useful arts" with the "polite arts"); Tench Coxe, *An Address to an Assembly of the Friends of American Manufactures, in Calling for More Domestic Manufacturing* (1787), at 17 (tying "useful arts" to manufactures); id. at 18 (describing progress in the useful arts as having produced improvements in numerous kinds of manufactures, from ships to whips to watches); George Logan, M.D., *A Letter to the Citizens of Pennsylvania, on the Necessity of Promoting Agriculture, Manufactures, and the Useful Arts* (1800) 12-13 (tying "useful arts" to manufacturing processes, and observing the connection between a country's prosperity and the progress in the useful arts); Karl B. Lutz, *Patents and Science*, 18 Geo. Wash. L. Rev. 50, 54 (1949) ("The term 'useful arts,' as used in the Constitution ... is best represented in modern language by the word 'technology.' ").

888 F.2d 835, 839-40 (Fed. Cir. 1989)). In other words, nominal or token recitations of structure in a method claim should not convert an otherwise ineligible claim into an eligible one. For the same reason, claims reciting incidental physical transformations also may not pass muster under section 101. To permit such a practice would exalt form over substance and permit claim drafters to file the sort of process claims not contemplated by the case law.

In *Benson*, the Court reviewed the facts of several of its precedents dealing with process patents before drawing the conclusion that "transformation" is the clue to patent-eligibility "of a process claim that does not include *particular machines*." *Benson*, 409 U.S. at 68-71 (emphasis added). Of the cases discussed, *Corning* (tanning and dyeing), *Cochrane* (manufacturing flour), *Tilghman v. Proctor*, 102 U.S. 707 (1880) (manufacturing fat acids), and *Expanded Metal Co. v. Bradford*, 214 U.S. 366 (1909) (expanding metal), can all fairly be read to involve transformation of some article or material to a different state or thing. *Id.* at 69-70. *Benson* also compared *O'Reilly v. Morse*, 56 U.S. (15 How.) 62 (1854), to *The Telephone Cases*, 126 U.S. 1 (1888), reasoning that Morse's eighth claim was disallowed because it failed to recite any machinery for carrying out the printing of characters at a distance, instead simply claiming the use of "electromagnetism, however developed" for that purpose. *Id.* at 68. In contrast, Bell's claim in *The Telephone Cases* recited certain

specified conditions for using a particular circuit for the transmission of sounds. *Benson*, 409 U.S. at 68-69.

These cases illustrate process claims where the recited machines played a central role in generating a useful result. In direct contrast, human-driven methods that merely recite a device that is insignificant to accomplishing the method (like the claim in *Grams*) and do not transform any article should not be recognized as a "process" claim similar to the above-cited cases. *See Diehr*, 450 U.S. at 191-92 ("insignificant post-solution activity will not transform an unpatentable principle into a patentable process. To hold otherwise would allow a competent draftsman to evade the recognized limitations on the type of subject matter eligible for patent protection.")

We acknowledge that it will not always be simple to draw the line between a statutory process appropriately "tied to a particular apparatus" and a nonstatutory method with nominal recitations of structure, but such a standard is necessary to prevent clever claim drafting from circumventing the principles underlying the Supreme Court's interpretation for "process."

In *Benson*, the patent claims were directed to a method for converting binary-coded-decimal (BCD) numerals into pure binary numerals for use with a general-purpose digital computer of any type. 409 U.S. at 64. The question before the Court was "whether the method described and claimed is a 'process' within the meaning of the Patent Act." *Id.* The Court characterized the claimed invention as "a generalized formulation for

programs to solve mathematical problems of converting one form of numerical representation to another." *Id.* at 65. The Court found that the "process" claim was "so abstract and sweeping as to cover both known and unknown uses of the BCD to pure binary conversion." *Id.* at 68. The Court found that "[t]he end use may (1) vary from the operation of a train to verification of drivers' licenses to researching the law books for precedents and (2) be performed through any existing machinery or future-devised machinery or without any apparatus." *Id.* The Court thus held that the claimed method was directed to non-statutory subject matter, because "[t]he mathematical formula involved here has no substantial practical application except in connection with a digital computer, which means that if the judgment below is affirmed, the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself." *Id.* at 71-72.

In *Flook*, the patent claims were directed to a method of updating alarm limits. 437 U.S. at 585. The Court found that "[t]he only difference between the conventional methods of changing alarm limits and that described in respondent's application rests in the second step – the mathematical algorithm or formula." *Id.* at 585-86. The Court noted that the claims did not "cover every conceivable application of the formula." *Id.* at 587. As such, the Court agreed that the claims did not seek to wholly preempt the mathematical formula. *Id.* at 589-90. Nonetheless, the Court held that the claimed method was directed to non-statutory subject matter,

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because "a claim for an improved method of calculation, even when tied to a specific end use, is unpatentable subject matter under § 101." *Id.* at 595 n.18. In doing so, the Court rejected the respondent's assumption that "if a process application implements a principle in some specific fashion, it automatically falls within the patentable subject matter of § 101." *Id.* at 593. The Court stated that this assumption "would make the determination of patentable subject matter depend simply on the draftsman's art and would ill serve the principles underlying the prohibition against patents for 'ideas' or phenomena of nature." *Id.* The Court summarized the basis for its holding as follows:

> Even though a phenomenon of nature or mathematical formula may be well known, an inventive application of the principle may be patented. Conversely, the discovery of such a phenomenon cannot support a patent unless there is some other inventive concept in its application.

*Id.* at 594.

In *Diehr*, the claimed invention was directed to a process for curing synthetic rubber. The question before the Court was "whether a process for curing synthetic rubber which includes in several of its steps the use of a mathematical formula and a programmed digital computer is patentable subject matter under 35 U.S.C. § 101." *Id.* at 177. In the claimed process, the actual temperature in the mold is constantly measured, and these measurements are fed back to the computer to use to repeatedly recalculate the cure time using the Arrhenius equation, so that when the recalculated

time equals the actual time that has elapsed since the press was closed, the computer signals a device to open the press. *Id.* at 178-79. The continuous measuring of the temperature inside the mold cavity, the feeding of this information to a digital computer which constantly recalculates the cure time, and the signaling by the computer to open the press, were all new in the art. *Id.* at 179. The patent examiner rejected the claims, finding that the steps carried out by the computer were non-statutory subject matter under *Benson* and the remaining steps of installing the rubber in the press and closing the press were merely conventional. *Id.* at 180-81. The Patent and Trademark Office Board of Appeals agreed with the examiner, but the Court of Customs and Patent Appeals reversed. *Id.* at 181. On review, the Supreme Court held that a physical and chemical process for molding precision synthetic rubber products falls within the § 101 categories of possibly patentable subject matter, because the claims involve a transformation of an article into a different state or thing and "[i]ndustrial processes such as this are the types which have historically been eligible to receive the protection of our patent laws." *Id.* at 184. The Court cited with approval its previous statement in *Benson* that "[t]ransformation and reduction of an article to a different state or thing is the clue to the patentability of a process claim that does not include particular machines." *Id.* (quoting *Benson*, 409 U.S. at 70 (internal quotation marks omitted)). In contrast to the facts in *Flook*, the Court noted:

> [T]he respondents here do not seek to patent a
> mathematical formula. Instead, they seek patent
> protection for a process of curing synthetic rubber.
> Their process admittedly employs a well-known
> mathematical equation, but they do not seek to pre-
> empt the use of that equation. Rather, they seek
> only to foreclose from others the use of that
> equation in conjunction with all of the other steps
> in their claimed process.

*Id.* at 187. The Court concluded that "a claim drawn to subject matter

otherwise statutory, does not become nonstatutory simply because it uses a

mathematical formula, computer program, or digital computer." *Id.* The

Court also stated the corollary, as follows:

> A mathematical formula does not suddenly
> become patentable subject matter simply by having
> the applicant acquiesce to limiting the reach of the
> patent for the formula to a particular technological
> use. A mathematical formula in the abstract is
> nonstatutory subject matter regardless of whether
> the patent is intended to cover all uses of the
> formula or only limited uses. Similarly, a
> mathematical formula does not become patentable
> subject matter merely by including in the claim for
> the formula token postsolution activity such as the
> type claimed in *Flook*.

*Id.* at 192 n.14.

For a process to be deemed patent-eligible under section 101,

*Diamond v. Diehr*, 450 U.S. 175 (1981) requires that two *separate* inquiries

must take place. First, the claim must qualify as a "process," as that term

has been interpreted by the courts. *Id.* at 181-84. Second, even if the claim

satisfies the Supreme Court's definition for "process," the claim must then

be evaluated for whether it is for an abstract idea, natural phenomenon, or

law of nature. *Id.* at 185-93. When conducting the section 101 analysis, the

claims must be examined "as a whole." *Id.* at 188.

In *Comiskey,* the Federal Circuit stated that "Supreme Court decisions

after the 1952 Patent Act have rejected a 'purely literal reading' of the

process provision and emphasized that not every 'process' is patentable."

*Id.* at 1375 (quoting *Flook,* 427 U.S. at 589). Rather "[t]he question is

whether the method described and claimed is a 'process' within the meaning

of the Patent Act." *Id.* (quoting *Gottschalk v. Benson,* 409 U.S. 63, 64

(1972)). The court held that claims directed to a method for mandatory

arbitration resolution were unpatentable under § 101 because "the patent

statute does not allow patents on particular systems that depend for their

operation on human intelligence alone, a field of endeavor that both the

framers and Congress intended to be beyond the reach of patentable subject

matter." *Id.* at 1378-79. The court stated:

> The prohibition against the patenting of
> abstract ideas has two distinct (though related)
> aspects. First, when an abstract concept has no
> claimed practical application, it is not patentable.
>
> ...
>
> Second, the abstract concept may have a
> practical application. The Supreme Court has
> reviewed process patents reciting algorithms or

> abstract concepts in claims directed to industrial
> processes. In that context, the Supreme Court has
> held that a claim reciting an algorithm or abstract
> idea can state statutory subject matter only if, as
> employed in the process, it is embodied in,
> operates on, transforms, or otherwise involves
> another class of statutory subject matter, i.e., a
> machine, manufacture, or composition of matter.
> 35 U.S.C. § 101.

*Id.* at 1376.

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(2)

*Method Claims 9-13, 16-20, 24-26, and 34-38*

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Unlike the method claims in *Comiskey*, Appellants' claims are

patentable under section 101.

Appellants' claims are similar to the method claims rejected in

*Comiskey* in that the claims do not transform any article to a different state

or thing. The simulation data produced by the claims, while perhaps

"useful" in one sense, is simply not the product of any transformation as

understood in the case law. Contrary to Appellants' contention that a

computer-simulated physical system is a real world thing, we find otherwise.

Appellants' claims are directed to simulating using models (i.e. modeling) of

physical systems (FF 3). These models are mathematical representations of

physical systems (FF 5). That Appellants have claimed the invention in

prose form (as simply "simulating") and have only mentioned exemplary

mathematical techniques used to perform the simulation (FF 5) does not

convert the simulating into anything more than simply solving purely

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mathematical representations of physical systems. We also note that the claimed simulating does not receive information from a real world physical system nor does it output data that controls a real world physical system. We do not find a transformation of any article to a different state or thing.

However, unlike the method claims in *Comiskey*, Appellants' claims recite a process that employs one of the other statutory categories. Specifically, claim 9 recites that the first simulating step is performed on "a first physical computing device" and the second simulating step is performed on "a second physical computing device" which we conclude is "a particular apparatus" to which the process is tied, not simply a generic computing device for performing the steps. Appellants' Specification describes this embodiment which uses two computing devices (FF 7) as well as a second embodiment, not covered by this claim, which uses a single computer (FF 8). Because the claim recites a particular apparatus, (1) the method operates on another class of statutory subject matter such that the method is a patentable "process", and (2) the method is not directed to an abstract idea. Unlike in *Benson*, this claim is directed to a particular machine implementation of the mathematical algorithm that does not encompass every substantial practical application of an abstract idea. *Benson*, 409 U.S. at 71-72. Accordingly, the claims meet the conditions set forth in the case law of the Supreme Court and the Federal Circuit.

Thus, claims 9-13, 16-20, 24-26, and 34-38 do not fall outside the scope of § 101.

B. *Rejection of System Claims 1-8, 29, 31, and 32 under 35 U.S.C. § 101*

Appellants contend that the subject matter of method claims 1-8, 29, 31, and 32 is statutory and the Examiner erred in rejecting these claims because:

(A) The claims produce data representing a computer-simulated physical system which is a real world thing (App. Br. 10-13).

(B) Patenting of these claims is not tantamount to patenting a mathematical algorithm (Reply Br. 3).

We disagree with Appellants' contentions (A) and (B). The claimed invention is directed to non-statutory subject matter. Claim 1, reproduced *supra*, is exemplary.[4]

(1)
*Principles Of Law*

The Supreme Court has held that "[e]xcluded from such patent protection are laws of nature, natural phenomena, and abstract ideas." *Diehr*, 450 U.S. at 185. "An idea of itself is not patentable.'" *Diehr*, 450 U.S. at 185 (quoting *Rubber-Tip Pencil Co. v. Howard*, 20 Wall. 498, 507, 22 L.Ed. 410 (1874); *Benson*, 409 U.S. at 67 ("[M]ental processes, and abstract intellectual concepts are not patentable."); *see also id.* at 71 ("It is

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[4] Appellants do not present any separate arguments for patentability of dependent claim 2-8 and 29-33, relying instead on the arguments presented for patentability of independent claim 1, from which they depend (App. Br. 11). We will treat only claim 1, as argued, and claims 2-8 and 29-33 will stand or fall with claim 1. 37 C.F.R. § 41.37(c)(1)(vii) (2007).

conceded that one may not patent an idea."). In contrast, "[i]t is now commonplace that an *application* of a law of nature or mathematical formula [or abstract idea] to a known structure or process may well be deserving of patent protection." *Diehr*, 450 U.S. at 187 (emphasis in original).

Clever claim drafting cannot circumvent these principles. That is, even when a claim appears to apply an idea or concept as part of a seemingly patentable process, one must ensure that it does not in reality seek patent protection for that idea in the abstract. *Diehr*, 450 U.S. at 191. Similarly, one cannot patent a process that comprises "every substantial practical application" of an abstract idea, because such a patent "in practical effect would be a patent on the [abstract idea] itself." *Benson*, 409 U.S. at 71-72.[5] Such limitations on process patents are important because without them, "a competent draftsman [could] evade the recognized limitations on the type of subject matter eligible for patent protection." *Diehr*, 450 U.S. at 192.

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[5]    The observation in *State Street* that "[w]hether the patent's claims are too broad to be patentable is not to be judged under § 101, but rather under §§ 102, 103, and 112" did not, nor could it, overrule the Supreme Court's pre-emption doctrine. *See State St. Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 1377 (Fed. Cir. 1998). Rather, pre-emption was not at issue in *State Street* since the claim in that case was particularly confined to a machine implementation, and did not suffer from the same defect as Appellants' claim.

(2)
*Claims 1-8, 29, and 31 -33*

Unlike method claims 9-13, 16-20, 24-26, and 34-38 discussed above, Appellants' system claims 1-8, 29, 31, and 32, lack any "particularly claimed combination of elements", and therefore lack those characteristics that separate a practical application of an idea from just the idea itself.

Appellants' claim 1 sets forth a computer-implemented system comprising a first and a second executing process with each executing process in turn setting forth a series of functions to be performed to carry out what is essentially the method of Appellants' claim 9. As we have already discussed, the method of claim 9 is "simply solving purely mathematical representations of physical systems." Therefore we must determine if claim 1 is "in reality [seeking] patent protection for that idea in the abstract." *Diehr*, 450 U.S. at 191.

We found that Appellants' claim 9 does not seek to patent its mathematical algorithm in the abstract and is instead directed to "a particular machine implementation of the mathematical algorithm." However, unlike claim 9, we do not find a particular machine being recited in claim 1. Instead, the sole structural limitation recited is the "computer-implemented system" of the preamble of claim 1. As Appellants have set forth by example, the claimed computer is not any particular apparatus (FF 6). Rather, we find that the computer or processor is essentially any conventional apparatus that performs the claimed functions. Thus, we

conclude the system of claims 1-8, 29, and 31-33 cover ("preempt") every substantial practical application of the abstract idea. We conclude that these claims are so broad that they are directed to the "abstract idea" itself, rather than any practical implementation of the concept.

Thus, these claims fall outside the scope of § 101.


## NEW GROUNDS OF REJECTION

### A. *35 U.S.C. § 112, first paragraph*

Using our authority under 37 C.F.R. § 41.50(b), we reject claims 39-44 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the Specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 39-44 each recite that the simulation occurs with "a speed greater than $O(n)$ [or $O(n^2)$ or $O(n^3)$] times the speed of the simulation using a single one of the computing devices." Appellants' Specification does not include the now claimed "a speed greater than . . ." limitation of claims 39-44. Appellants' sole disclosure relating to "speed" is found at line 1 of page 8 of the Specification which states "if the model were a bottleneck in the simulation system."

Additionally, because we conclude that Appellants are not entitled to claim the subject matter of claims 39-44 as written, we do not reach a

determination of whether these claims are directed to non-statutory subject matter under § 101.

## B. *35 U.S.C. § 112, second paragraph*

Using our authority under 37 C.F.R. § 41.50(b), we reject claims 10, 11, 17, 18, and 36-38 under 35 U.S.C. § 112, second paragraph as being indefinite.

As to claim 10, the singular "processor" limitation of claim 10 conflicts with the plural "computing device" limitations added to claim 9 by amendment.

As to claim 11, the plural "processor" limitations of claim 11 are redundant to the plural "computing device" limitations added to claim 9 by amendment.

As to claims 17 and 18, "the first model" has no antecedent basis.

As to claims 36-38, "[t]he system of claim 24" has no antecedent basis, because claim 24 is a method claim.

## C. *37 C.F.R. § 41.50(b)*

37 C.F.R. § 41.50(b) provides that, "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 C.F.R. § 41.50(b) also provides that the Appellants, *WITHIN TWO MONTHS FROM THE DATE OF THE DECISION*, must exercise one of the

following two options with respect to the new grounds of rejection to avoid

termination of proceedings (37 C.F.R. § 1.197 (b) as to the rejected claims:

> (1) Reopen prosecution. Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner ...

> (2) Request rehearing. Request that the proceeding be reheard under 37 C.F.R. § 41.52 by the Board upon the same record ...

### D. *37 C.F.R. § 41.52(a)*

Regarding the affirmed rejection, 37 C.F.R. § 41.52(a)(1) provides

"Appellant may file a single request for rehearing within two months from

the date of the original decision of the Board." Should Appellants elect to

prosecute further before the Examiner pursuant to 37 C.F.R. § 41.50(b)(1),

in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145

with respect to the affirmed rejection, the effective date of the affirmance is

deferred until conclusion of the prosecution before the Examiner unless, as a

mere incident to the limited prosecution, the affirmed rejection is overcome.

If Appellants elect prosecution before the Examiner and this does not result in allowance of the application, abandonment, or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for rehearing thereof.

## CONCLUSIONS OF LAW

(1) Appellants have established that the Examiner erred in rejecting claims 9-13, 16-20, 24-26, and 34-38 under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

(2) Appellants have failed to establish that the Examiner erred in rejecting claims 1-8, 29, and 31-33 under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

(3) Claims 1-8, 10, 11, 17, 18, 29, 31-33, and 36-44 are not patentable.

(4) On this record, claims 9, 12, 13, 16, 19, 20, 24-26, 34, and 35 have not been shown to be unpatentable.

DECISION

The Examiner's rejection of claims 1-8, 29, and 31-33 is affirmed.

The Examiner's rejection of claims 9-13, 16-20, 24-26, and 34-38 is reversed.

We reject claims 39-44 under 35 U.S.C. § 112, first paragraph.

We reject claims 10, 11, 17, 18, and 36-38 under 35 U.S.C. § 112, second paragraph.

Since we have entered a new rejection, our decision is not a final agency action.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED-IN-PART
37 C.F.R. § 41.50(b)

rwk

Matthew R. Schantz
Woodard, Emhardt, Naughton, Moriarty and McNett
Bank One Center/Tower
111 Monument Circle, Suite 3700
Indianapolis IN 46204-5137